

CLAIMS

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

- 1 1. A method of operating a charged particle beam
2 tool, said method including steps of
3 dithering a shadow pattern relative to and
4 within a charged particle beam, and
5 detecting incidence of said shadow pattern on a
6 sparse array of targets.
- 1 2. A method as recite in claim 1 wherein said
2 dithering step includes steps of
3 imposing said shadow pattern on said charged
4 particle beam,
5 deflecting said charged particle beam in a
6 dither pattern, and
7 passing said charged particle beam through a
8 shaping aperture.
- 1 3. A method as recited in claim 1, including the
2 further steps of
3 passing said charged particle beam through a
4 first shaping aperture,
5 deflecting said charged particle beam, and
6 intercepting a portion of said charged particle
7 beam with a second shaping aperture while shaping a
8 remainder of said charged particle beam passed
9 through said second shapiong aperture.

1 4. A method as recited in claim 2, including
2 further steps of
3 deflecting said charged particle beam, and
4 intercepting a portion of said charged particle
5 beam with a second shaping aperture while shaping a
6 remainder of said charged particle beam passed
7 through said second shaping aperture.

1 5. A method as recited in claim 1, wherein said
2 detecting step includes steps of
3 projecting a portion of said charged particle
4 beam on a target including fiducial marks of
5 scintillating material, and
6 detecting reduction in light output when said
7 dithered shadow pattern is incident on one or more
8 of said fiducial marks.

1 6. A method as recited in claim 1, wherein said
2 dithering step is performed by moving said shadow
3 pattern in a repeated pattern having a repetition
4 time.

1 7. A method as recited in claim 6, wherein said
2 repetition time is similar to a spot exposure time.

1 8. A method as recited in claim 6, wherein said
2 repeated pattern is a raster.

1 9. A method as recited in claim 6, wherein said
2 repeated pattern is an angled shape.

1 10. A method as recited in claim 9, wherein said
2 angled shape is retraced with an offset.

1 11. A method as recited in claim 5, wherein said
2 dithering step is performed by moving said shadow
3 pattern in a repeated pattern having a repetition
4 time.

1 12. A method as recited in claim 11, wherein said
2 repetition time is similar to a spot exposure time.

1 13. A method as recited in claim 11, wherein said
2 repeated pattern is a raster.

1 14. A method as recited in claim 11, wherein said
2 repeated pattern is an angled shape.

1 15. A method as recited in claim 14, wherein said
2 angled shape is retraced with an offset.

1 16. A charged particle beam lithography tool
2 including
3 a source of a beam of charged particles
4 means for causing a shadow pattern within said
5 charged particle beam,
6 means for dithering said shadow pattern,
7 means for shaping said charged particle beam,
8 means for deflecting said charged particle beam
9 to a desired location on a target including fiducial
10 marks,
11 means for detecting when said dithered shadow
12 pattern is incident on said fiducial marks, and
13 means for generating a correction for said
14 means for deflecting in response to said means for
15 detecting.

1 17. A charged particle beam lithography tool as
2 recited in claim 16, wherein said fiducial marks
3 comprise scintillating material.

1 18. A charged particle beam lithography tool as
2 recited in claim 17, wherein a pattern of said
3 fiducial marks correspond to said shadow pattern
4 referred to a target.

1 19. A charged particle beam lithography tool as
2 recited in claim 16, wherein said beam including
3 said shadow pattern is dithered prior to passing
4 through said means for shaping.

1 20. A method of operating a charged particle beam
2 lithography tool including steps of
3 causing a moving shadow pattern within a shaped
4 or patterned charged particle beam,
5 deflecting said shaped or patterned charged
6 particle beam to a desired location on a target, and
7 correcting said deflecting step based on a time
8 of incidence of said moving shadow pattern on
9 fiducial marks on said target.